

TELEPHONE INTERCEPTOR

CROSS REFERENCE TO A PROVISIONAL APPLICATION

[0001] This patent application claims priority on Provisional Application Serial Number 60/151,177, filed on August 27, 1999, the entirety of which is hereby incorporated by reference.

CROSS REFERENCE TO A PREVIOUSLY-FILED U.S. PATENT APPLICATION

[0002] This patent application is a continuation-in-part claiming priority on U.S. Patent Application Serial Number 09/648,023, filed on August 25, 2000, the entirety of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0003] **Field of the Invention**

[0004] The present invention relates to telephone communications and, more specifically, to a method and apparatus for intercepting and, if necessary, delaying telephone calls.

[0005] **Description of the Prior Art**

[0006] Existing telephones often ring at inopportune moments, such as a just few minutes after a child has begun a nap, a few minutes after a telephone user has stepped into a bath, or when the user simply desires privacy. Several approaches to this problem are typically employed. For example, one may ignore the telephone and allow an answering machine to answer the telephone. However, this approach may be irritating to the user and may wake the freshly fallen asleep child. The user may also turn the telephone ringer "off." However, this approach requires that every telephone in a house be turned off also. The user may take the

telephone off of the hook. However, this approach causes incoming callers to believe that the user is actively accepting telephone calls, causing considerable frustration. Also, the user may not be able to place outgoing calls with the off-hook approach.

[0007] Some telephone sets employ “do not disturb” buttons that inhibit all ringing once activated. However, users often forget to release the do not disturb function once they desire to start receiving calls again and, thus, miss desired incoming calls. Furthermore, such “do not disturb” buttons usually only apply to a single telephone and not an entire household telephone loop.

[0008] Therefore, there is a need for a system that allows a user to inhibit ringing of every telephone in a household and, if the user desires, to generate a message indicating that the user wishes not to be called for a selected period of time.

SUMMARY OF THE INVENTION

[0009] The disadvantages of the prior art are overcome by the present invention which, in one aspect, is an apparatus for intercepting telephone calls on a telephone channel connected to a telephone. A ring detector, that is in communication with the telephone channel, is capable of detecting an incoming telephone call and generates a ring signal upon detection of an incoming telephone call. A user input receives an input from a user indicating that the user desires not to be called. A counter, that is responsive to the user input, is programmed to count a selected amount of time from assertion of the user input. A delay circuit, that is responsive to the counter, the ring signal and the user input, is programmed to allow the telephone to ring if an incoming call has been detected and if more than the selected amount of time has passed since the user input was last asserted. The delay circuit is also programmed to prevent the telephone from ringing if an incoming call has been detected and if less than the selected amount of time has passed since the user input was last asserted.

[0010] In another aspect, the invention is a method of intercepting telephone calls on a telephone channel connected to a telephone and a user input that indicates that a user desires not to be called. An incoming telephone call is detected on the telephone channel. A ring signal is generated upon detection of an incoming telephone call. It is determined if the user input has been asserted by the user. The telephone is allowed to ring if an incoming call has been detected and if more than a selected amount of time has passed since the user input was last asserted. The telephone is prevented from ringing if an incoming call has been detected and if less than the selected amount of time has passed since the user input was last asserted.

[0011] These and other aspects of the invention will become apparent from the following description of the preferred embodiments taken in conjunction with the following drawings. As would be obvious to one skilled in the art, many variations and modifications of the invention may be effected without departing from the spirit and scope of the novel concepts of the disclosure.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWINGS

- [0012] **FIG. 1A** is a schematic diagram of one embodiment of the invention.
- [0013] **FIG. 1B** is a schematic diagram of a selector circuit employed in one embodiment of the invention.
- [0014] **FIG. 1C** is a schematic diagram of a video display circuit employed in one embodiment of the invention.
- [0015] **FIG. 2A** is a flow chart showing the timing function.
- [0016] **FIG. 2B** is a flow chart showing the inhibiting function.
- [0017] **FIG. 3A** is a schematic diagram of one embodiment of an interceptor.
- [0018] **FIG. 3B** is a schematic diagram of a timer usable in the embodiment of FIG. 3A.
- [0019] **FIG. 3C** is a schematic diagram of a DTMF detector usable in the embodiment of FIG. 3A.
- [0020] **FIG. 3D** is a schematic diagram of a power supply driver usable in the embodiment of FIG. 3A.
- [0021] **FIG. 3E** is a schematic diagram of voltage regulator usable in the embodiment of FIG. 3A.
- [0022] **FIG. 3F** is a schematic diagram of a message generator usable in the embodiment of FIG. 3A.

[0023] **FIG. 3G** is a schematic diagram of a message recording system usable in the embodiment of FIG. 3A.

DETAILED DESCRIPTION OF THE INVENTION

[0024] A preferred embodiment of the invention is now described in detail. Referring to the drawings, like numbers indicate like parts throughout the views. As used in the description herein and throughout the claims, the following terms take the meanings explicitly associated herein, unless the context clearly dictates otherwise: the meaning of “a,” “an,” and “the” includes plural reference, the meaning of “in” includes “in” and “on.” Also, as used herein, “global computer network” includes the Internet.

[0025] As shown in FIGS. 1A-1C, the present invention **100**, includes an interceptor **110** that intercepts telephone calls received from a local exchange carrier (LEC) **102** to a household telephone loop **104**. The telephone loop **104** includes one or more telephones **112** connected to a common telephone channel, such as a hard wired telephone line.

[0026] The interceptor **110** intercepts incoming telephone calls on the telephone channel and selectively inhibits ringing of the telephone sets **112** connected to the telephone channel for a selected period of time. In one embodiment, a user presses a button, or other user input, that acts like a “snooze bar” on an alarm clock by inhibiting the ringing of the telephone. Once a preselected period from the time the button is depressed has expired, the telephone is allowed to ring normally. A lamp **111** may be used to indicate an incoming call when the ringing is inhibited.

[0027] Unlike an answering machine, the invention **100** provides the capability of answering all incoming calls without ringing the telephone sets within a subscriber’s local loop for a selected period of time. In one embodiment, each click of the snooze button will provide a progressively longer period of ring delay. For example, one click will delay ringing for 15 minutes, a second click will delay ringing for 30 minutes, a third click will delay ringing for one hour, etc. Even if the invention is currently active, outgoing calls are allowed any time. Unlike

a do not disturb button, the inhibitor **110** is capable of inhibiting ringing for only a selected amount of time, after which the user is able to receive telephone calls normally.

[0028] The invention may be embodied as a “do not disturb” device, in which the invention detects the ac ring signal on the telephone line and immediately sets the device to an “off-hook” condition. This action completes the circuit to the local telephone exchange (LEC) and DC current flows to the user’s local loop. The LEC removes the ringing signal and the ring-back tone from the circuit. This prevents the ringing signal from reaching any of the telephone sets within the user’s local loop. In one embodiment, the invention then plays an audio message to the caller with instructions regarding when to call back. The device then returns the line to the on-hook condition.

[0029] The device may also generate a call-in-progress indication to the user. This may be done with an indicator light, a text or graphic indication on a video display **124** (e.g., a television or computer screen), or even by playing soft music. The message could even include a caller identification. The user would then have the option to lift the handset and accept the call. In one embodiment, the invention could automatically activate an answering machine **115** during the delay period, allowing the caller to leave a message.

[0030] In one illustrative embodiment, a telephone selector circuit **114** is capable of allowing the user to select ringing be inhibited on only certain telephones of a group of commonly-connected telephones. The telephone selector circuit **114** could include an input mechanism for a user to identify the telephones on which to inhibit ringing.

[0031] The telephones can communicate with the interceptor so that the telephone keypad could act as an input mechanism. As would be readily appreciated by those of skill in the art, the interceptor **110** can exist as a stand-alone unit, can be embedded into each the telephones **112** (wherein each of several telephones could be in communication with each other – which is already accomplished with telephones already on a common household telephone line) or could

reside at the local exchange carrier **102**. For example, the telephone keypad could be the input mechanism and the user would indicate an input by pressing a sequence of keys that would not be found in an ordinary telephone number. In one exemplary encoding, the user could input a series of characters to indicate commencement of a programming phase (e.g., “*#”) to indicate that a telephone was being selected. A subsequent entry of a number would identify the telephone (e.g., “03” could indicate telephone number three) and a subsequent character (e.g., “#” could indicate termination of the programming phase. In the case of several telephones being in communication on a single household telephone line, any user inputs entered through the keypad of one telephone is sensed in the form of DTMF tones by all of the other telephones connected to the household telephone line. The telephone identification number would then be stored in a memory location **115** and would be sent to a plurality of comparators **118**, each of which compares the number in the memory location **115** to a predetermined number **117a-n** that corresponds to a telephone **112a-n**. Each comparator **118** controls a switch **120a-n** that selectively allows a call from the local exchange carrier **102** to be connected to or blocked from the selected telephone **112a-n**.

[0032] In one embodiment, the interceptor **110** is controlled by a programmable processor **116** (such as any one of the many N32-type microprocessors that are generally available), that may be coupled to a graphics card **122**. The processor **116** would include a memory for holding program instructions and user input. The graphics card **122** may be used to drive a user interface, such as a video display **124**. The graphics card **122** could be used, for example, to generate an icon **126** that is indicative of an incoming call during a period when ringing is inhibited.

[0033] As shown in FIG. 2A, the inhibitor waits until it senses a user input **202** indicating that the user desires not to be called for a selected amount of time. Upon sensing the user input, the inhibitor starts a timer **204**. The inhibitor also continuously waits for incoming calls **210**. Upon sensing an incoming call, the device asserts a ring signal **212** and determines whether the telephone number of the incoming call corresponds to a list of preferred callers **211**. If a

preferred caller embodiment is activated, then the user is able to input a list of telephone numbers that the user always wants to cause the telephone to ring. Inputting the list may be accomplished using the keypad of one of the telephones connected to the interceptor by inputting a control sequence. For example, if the user inputs “**##5155551212#” it could cause the telephone number “515-555-1212” to be stored in the user’s preferred caller list. This feature could be useful for allowing only calls from family members to cause the telephone to ring, while the rest do not. This list may be input by the user. If the incoming call is from a caller on the list, then the telephone is allowed to ring **222**, otherwise the system determines if the user input has been asserted **214**. If not, then the telephone is allowed to ring **222**, otherwise the inhibitor determines if time remains on the timer **216** (which is typically a count-down timer). If the timer has not timed out then ringing is inhibited **220**, otherwise the telephone is allowed to ring **222**.

[0034] The user input could be a button on a telephone handset, or other device. It could also be entered by pressing a preselected set of keys on a telephone key pad. For example, by entering “*47” (or some other sequence of keys) the user could activate the inhibitor. This could be done by circuitry installed in the local telephone, or could be done by software maintained by the LEC. In fact, all of the functions of the invention could be done either locally or at the LEC.

[0035] As shown in FIGS. 3A-3G, one embodiment of the invention **310** includes: a unit activator circuit **320** that allows the user to interface with the device, allowing the user to indicate that the user desires not to be called for a selected period; a ring detector and off-hook activator circuit **330** that detects incoming telephone calls and generates a ring signal upon detection of a incoming telephone call, thereby inhibiting ringing of the telephones in a household loop; a voice message playback circuit **340** that generates a voice message to the caller, if the user desires such a message to be generated; and a voice message recording circuit **350** that is used to record voice messages.

[0036] The unit activator circuit **320** includes a settable timer circuit, which may be activated by any telephone in the household. The unit activator circuit **320** also includes a circuit **320b** that detects DTMF tones on the telephone channel. The ring detector and activator circuit **330** provides a visual indicator that calls are being intercepted and includes a power supply **330a** that drives the ring inhibiting function. The power supply **330a** allows outgoing calls and allows answering of calls during an interception period. The ring detector and off-hook activator **330** also includes an off-hook activator **330b**.

[0037] The voice message playback circuit **340** transmits a user-recorded message indicating that the user is not currently answering telephone calls. The playback circuit **340** could also be programmed to provide an indication to the caller of the amount of time remaining until the caller should try calling again. The voice message recording circuit **350** records messages from callers and acts as an answering machine.

[0038] As will be clearly understood by those of skill in the art, the invention could be applied to both hard wired telephone lines, wireless telephone lines and virtual telephone lines (e.g., those formed via the global computer network).

[0039] The above described embodiments are given as illustrative examples only. It will be readily appreciated that many deviations may be made from the specific embodiments disclosed in this specification without departing from the invention. Accordingly, the scope of the invention is to be determined by the claims below rather than being limited to the specifically described embodiments above.